

Find  $f+g$  and  $f-g$  for each.

9.)  $f(x) = -3x^2 - 1$ ;  $g(x) = -5x$

4  $f+g = (-3x^2 - 1) + (-5x)$   
 $\boxed{-3x^2 - 5x - 1}$

$f-g = (-3x^2 - 1) - (-5x)$   
 $\boxed{-3x^2 + 5x - 1}$

Find  $f \cdot g$  and  $\frac{f}{g}$ .

10.)  $f(x) = 2x^2$ ;  $g(x) = 7 - x$

$f \cdot g = (2x^2)(7 - x)$   
 $\boxed{14x^2 - 2x^3}$

$\frac{f}{g} = \frac{2x^2}{(7-x)}$

If  $f(x) = x - 3$  and  $g(x) = x^2 - 9$ , find each new function and write it in simplest form.

11.)  $f - g$

2  $(x - 3) - (x^2 - 9)$   
 $x - 3 - x^2 + 9$   
 $\boxed{-x^2 + x + 6}$

12.)  $\frac{f}{g}$

$\frac{x - 3}{x^2 - 9}$   
 $\frac{\cancel{x - 3}}{(x - 3)(x + 3)} = \boxed{\frac{1}{x + 3}}$

Find  $f \circ g$  and  $g \circ f$

13.)  $f(x) = -4x^2 + 3x - 1$ ;  $g(x) = 3$

2  $f \circ g(x) = -4(3)^2 + 3(3) - 1$   
 $-4(9) + 9 - 1$   
 $-36 + 9 - 1$   
 $-37 + 9$   
 $\boxed{-28}$

$g \circ f(x) = \boxed{3}$

no variable  
constant function

If  $f(x) = 3x - 4$  and  $g(x) = -x^2$ , evaluate the composite function. (oops!)

14.)  $(f \circ g)(-2)$   $(g \circ f)(-2)$

4  $f(-2) = 3(-2) - 4$   
 $-6 - 4$   
 $-10$   
 $g(-10) = -(-10)^2$   
 $= \boxed{-100}$

15.)  $(f \circ f)(2)$

$g \circ g$   
 $-(-x)^2$   
 $-(-x^2)(-x^2)$   
 $(g \circ g) = -x^4$   
 $g \circ g(2) = -2^4$   
 $= \boxed{-16}$

16.) Simplify each exponent expression.

a.)  $\left(\frac{4a^3b^{-3}}{a^8b^2}\right)^{-2}$

3  $\frac{4^{-2}a^{-6}b^6}{a^2b^{-4}} = 4^{-2}a^{-8}b^{10}$   
 $= \boxed{\frac{b^{10}}{16a^8}}$

b.)  $(x^{-3}y^{-1})^{-1}(x^0y^3)^2$

$(x^3y^1)(x^0y^6)$   
 $x^3y^1y^6$   
 $\boxed{x^3y^7}$

c.)  $\left(\frac{-2z^2}{x^3}\right)^7$

$\left(\frac{(-2)^7 z^{14}}{x^{21}}\right)$   
 $\boxed{\frac{-128z^{14}}{x^{21}}}$